"Ocelet: a modelling language and a simulation environment for studying landscape dynamics" par Danny Lo Seen

Type de résumé : Oral presentation
Session : Session 1 : Représentation du paysage
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Modelling spatial dynamics in landscapes can be a means for better understanding the multiple and complex ongoing processes that underlie important issues facing societies today. Hypotheses and independent knowledge inferred from ground observations can be confronted for consistency, and the mechanisms requiring finer descriptions can also be identified. Different scenarios of landscape management can then be simulated and the possible consequences of the measures taken assessed. However, modelling landscape dynamics at different temporal and spatial scales remains a challenging task. Various approaches have been proposed to address this, including cellular automata, agent-based systems, discrete event systems, system dynamics and geographic information systems, each displaying specific benefits in some domains of application, and weaknesses in others.

In this area of research, we are exploring an approach based on the manipulation of graphs (mathematical object expressing a set of entities, some of which are linked) that are employed here in an innovative way for modelling landscape dynamics. Concepts essential for modellers had to be identified and formally defined. A modelling computer language (called Ocelet) was then developed, together with the grammar and syntax needed to manipulate these concepts, the compiler, and the environment/ interface for building models and running simulations. Ocelet is thus both a modelling language and a simulation tool. To illustrate its usage in diverse situations, four case studies are presented: 1) land cover changes in an agroforestry landscape; 2) coastal dynamics of mangrove ecosystems; 3) the dissemination of a pathogen among neighbouring agricultural plots; and 4) temporary pond and mosquito population dynamics for understanding Rift Valley Fever (RVF) occurrence.

Références bibliographiques :

Mots-clés :
language, landscape dynamics
Commentaires